

**Title: Two-dimensional active pixel InGaAs focal plane arrays**

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**ABSTRACT**

Switching and amplifying characteristics of a newly developed two-dimensional InGaAs Active Pixel Imager Array are presented. The sensor array is fabricated from InGaAs material epitaxially deposited on an InP substrate. It consists of an InGaAs photodiode connected to InP depletion-mode junction field effect transistors (JFETs) for low leakage, low power and fast control of circuit signal amplifying, buffering, selection and reset. This monolithically integrated active pixel sensor configuration eliminates the need for hybridization with a silicon multiplexer, and in addition, allows the sensor to be front illuminated, making it sensitive to visible as well as near infrared signal radiation. Adapting the existing 1.55  $\mu\text{m}$  fiber optical communication technology, this integration will be an ideal system of optoelectronic integration for dual band (0.5-2.5  $\mu\text{m}$ , Visible/IR) applications near room temperature, for use in atmospheric gas sensing in space and target identification on earth. In this paper, 4x4 test arrays will be described. The effectiveness of switching and amplifying circuits will be discussed in terms of circuit in preparation for two dimensional InGaAs active pixel sensor arrays for applications in multifunctional, transportable shipboard surveillance, night vision and emission spectroscopy.

**Keywords:** Two-dimensional, Low power, Dual (Visible/IR) responses, InGaAs PIN, InP JFETs.